

PATENT  
TS9502 (US)  
CML:EM

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF APPEALS AND INTERFERENCES

In re application of	)	
	)	
HANS GEORG LEFFER	)	Confirmation No.: 6799
	)	
Serial No. 10/521,161	)	Group Art Unit: 1797
	)	
Filed January 3, 2005	)	Examiner: Huy Tram Nguyen
	)	
REACTOR SYSTEM WITH SEVERAL	)	July 15, 2010
REACTOR UNITS IN PARALLEL	)	
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COMMISSIONER FOR PATENTS  
P. O. Box 1450  
Alexandria, VA 22313-1450

Sir:

**APPEAL BRIEF**

Applicant hereby submits this Appeal Brief in order to appeal the final rejection of claims 1, 2, 5, 6, 9, 10 and 12-14 in the office action mailed February 2, 2010.

Please charge any fees that are necessary in connection with the filing of this brief to Shell Oil Company, Deposit Account No. 19-1800.

**Real Party in Interest**

The real party in interest is Shell Oil Company.

**Related Appeals and Interferences**

To the best of the undersigned's knowledge, there are no related appeals or interferences.

**Status of the Claims**

Claims 1, 2, 5, 6, 9, 10 and 12-14 are pending in the application and were finally rejected in the office action mailed February 2, 2010. Claims 1, 2, 5, 6, 9, 10 and 12-14 are on appeal.

**Status of Amendments**

No amendments to the claims have been filed since the Final Rejection.

**Summary of Claimed Subject Matter**

The invention as set forth in independent claim 1 is directed to a reactor system suitable for carrying out exothermic chemical reactions comprising one or more reactive feed lines fed into two or more single unit operated reactors which are to be operated as one single unit. Each reactor comprises a multitubular fixed bed catalyst arrangement and the reactors have one or more common product discharge lines. This system is described generally in the specification at page 3, line 20 through page 8, line 2. Each of the reactors comprises a separated, individual reactor and each of the reactors comprises an indirect heat exchange system, which heat exchange systems are jointly operated to cool the reactors as if they were a single unit. This is discussed in the specification at page 6, lines 4 to 19.

Independent claim 9 is directed to a process for the preparation of hydrocarbons by reaction of carbon monoxide and hydrogen in the presence of a catalyst and elevated temperature and pressure wherein the process is performed in a reactor system comprising one or more common reactant feed lines fed into two or more single unit operated reactors which are operated as one single unit. Each reactor comprises a multitubular fixed bed catalyst arrangement and the reactors have one or more common product discharge lines. The process and system are described in the specification generally at page 3, line 20 through page 8, line 2. Each reactor comprises a

separated, individual reactor in which each of the reactors comprises an indirect heat exchange system, which heat exchange systems are jointly operated to cool the reactors as if they were a single unit. This system is discussed in the specification at page 6, lines 4 to 19.

### **Grounds of Rejection to be Reviewed on Appeal**

Claims 1, 2, 5, 6, 10 and 13 were rejected under 35 U.S.C. 103(a) as being unpatentable over Owen et al. (US 4,789,528) in view of Kao et al. (US 5,266,281).

Claim 12 was rejected under 35 U.S.C. 103(a) as being unpatentable over Owen et al. in view of Kao et al. and Cachera et al. (US 3,968,653).

Claim 9 was rejected under 35 U.S.C. 103(a) as being unpatentable over Kao et al. in view of Owen et al.

Claim 14 was rejected under 35 U.S.C. 103(a) as being unpatentable over Kao et al. in view of Owen et al. and Haag et al. (4,279,830)

### **Argument**

*Rejection of claims 1, 2, 5, 6, 10 and 13 under 35 U.S.C. 103(a) as being unpatentable over Owen et al. in view of Kao et al.*

The present invention is directed to a system for carrying out exothermic chemical reactions in which two or more single unit operated reactors are operated in parallel with one or more common reactant feed lines and one or more common product discharge lines. As used in claims 1 and 9, the term "single unit operated reactors" means that all of the individual, separated reactors are operated together in parallel as if they were a single large reactor. As currently amended, the claims also require that the reactors comprise a multitubular fixed bed catalyst arrangement and that the reactors comprise an indirect heat exchange system, which heat exchange systems are jointly operated to cool the reactors as if they were a single unit.

Owen is directed to a technique for sequential rotation of reactors in a multi-reactor catalytic conversion system. As set forth in the Summary of the Invention, Owen is directed to a system for sequentially rotating a system of three or more reactors to allow the most fresh, or newly generated, catalyst to be in the last process flow position and the least active, or most used catalyst to be in the first position, with one reactor in the regeneration mode. Thus, Owen

describes a process in which one of the reactors is in the regeneration mode and the other reactors are operated in series with the reactor having the oldest catalyst being in the first position and the reactor with the newest catalyst being in the last position.

Independent claim 1 of the present application is directed to a reactor system comprising two or more single unit operated reactors that are fed by a common feed line and have product removed through a common product discharge line. Accordingly, this system is designed such that the reactors are operated in parallel, not in series as is the Owen system. Additionally, the claim as amended also requires that the reactors comprise an indirect heat exchange system, which heat exchange systems are jointly operated to cool the reactors as if they were a single unit. These features are neither taught nor suggested by the Owen et al. reference.

Accordingly, Applicant submits that independent claim 1 would not have been obvious in view of Owen and Kao. Kao provides no teaching to overcome the shortcomings in the disclosure of the Owen et al. reference.

Inasmuch as claims 2, 5, 6, 10 and 13 all depend from claim 1, Applicant submits that they are patentable for the same reasons discussed above with respect to claim 1.

*Rejection of claim 12 under 35 U.S.C. 103(a) as being unpatentable over Owen et al. in view of Kao et al. and Cachera et al.*

Applicant submits that claim 12 would not have been obvious over the cited references for the same reason discussed above with respect to claim 1.

*Rejection of claim 9 under 35 U.S.C. 103(a) as being unpatentable over Kao et al. in view of Owen et al.*

Independent claim 9 is directed to a process for the preparation of hydrocarbons wherein the process is performed in the reactor system comprising two or more single unit operated reactors which have a common reactant feed line and a common product discharge line. As discussed above, these reactors are operated in parallel, not in series as is the Owen process. Accordingly, applicant submits that claim 9 would not have been obvious for the reasons discussed above.

*Rejection of claim 14 under 35 U.S.C. 103(a) as being unpatentable over Kao et al. in view of Owen et al. and Haag et al.*

Inasmuch as claim 14 depends from claim 9, Applicant submits that it would not have been obvious for the same reasons discussed above with respect to claim 9.

**Conclusion**

Based on the foregoing arguments, Applicant asserts that the claims of the present application would not have been obvious in view of the cited references. It is respectfully requested that this Appeal be upheld and that the application be sent back to the Examiner for allowance.

Respectfully submitted,

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## **CLAIMS APPENDIX**

1. A reactor system suitable for carrying out exothermic chemical reactions comprising one or more common reactant feed lines fed into two or more single unit operated reactors which are to be operated as one single unit, each reactor comprising a multitubular fixed bed catalyst arrangement, the reactors having one or more common product discharge lines, wherein each reactor comprises a separated, individual reactor and in which each of the reactors comprises an indirect heat exchange system, which heat exchange systems are jointly operated to cool the reactors as if they were a single unit.
2. The reactor system of claim 1 comprising between 3 and 8 single unit operated reactors.
3. (Canceled)
4. (Canceled)
5. (Previously Presented) The reactor system of claims 1 comprising one common gas reactant feed line.
6. The reactor system of claims 1 comprising one common gas product discharge line.
7. (Canceled)
8. (Canceled)
9. A process for the preparation of hydrocarbons by reaction of carbon monoxide and hydrogen in the presence of a catalyst at elevated temperature and pressure, wherein the process is performed in a reactor system comprising one or more common reactant feed lines fed into two or more single unit operated reactors which are operated as one single unit, each reactor comprising a multitubular fixed bed catalyst arrangement, the reactors having one or more common product

discharge lines, wherein each reactor comprises a separated, individual reactor and in which each of the reactors comprises an indirect heat exchange system, which heat exchange systems are jointly operated to cool the reactors as if they were a single unit.

10. The reactor system of claim 1 comprising four single unit operated reactors.
11. (Canceled)
12. The reactor system of claim 1, wherein the heat exchange system comprises a thermosiphon system.
13. The reactor system of claim 1 comprising one common liquid product discharge line.
14. The process of claim 9, wherein the catalyst comprises a cobalt catalyst.

## **EVIDENCE APPENDIX**

None

## **RELATED PROCEEDINGS APPENDIX**

None